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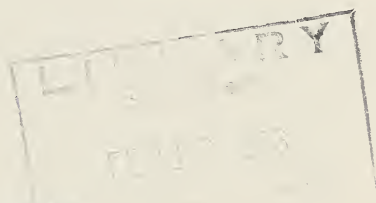


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CREEP FEEDING BEEF CALVES IN FLORIDA

Effects on Weight and Market Grade

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Creep Feeding Beef Calves in Florida: Effects on Weight and Market Grade¹

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INTRODUCTION

Creep feeding² beef calves is a controversial subject. It is followed by certain breeders in both purebred and commercial operations. The primary objective in this practice is to improve the weight, condition, and appearance of young animals. Although the economy of creep feeding is often challenged, the wisdom of it is also questionable because it masks, in part, the mothering ability of the cow. Creep feeding is frequently recommended when conditions are unfavorable for the growth of calves, and numerous reports have shown conflicting results.

The early work of Black and Trowbridge (1)³ showed that high-grade Shorthorn calves that were creep fed outgained calves that were not creep fed by as much as 100 pounds during the suckling period. In addition, creep-fed calves main-

tained this advantage during the 84-days postweaning feeding period. This advantage was lost in a postweaning feeding period that lasted longer than 84 days. Bray (2) reported a 50-pound advantage in preweaning gain for creep-fed calves of predominantly British breeding. A similar advantage in weight gain was reported by Duncan et al. (5) over a 4-year period, but creep feeding was profitable only during 1 year in which rainfall was not adequate to maintain good pasture.

In a 4-year study by Johnson and Fenn (8), creep-fed calves averaged 73 pounds greater gain during the suckling period and were more profitable when sold at weaning than non-creep-fed calves. However, the non-creep-fed calves were more profitable in the feedlot when fed approximately 200 days following weaning. Foster et al. (6) found little advantage in weight gain and slaughter grade in creep feeding grade Hereford calves on good native range. Taylor et al. (12) reported that creep feeding high quality calves increased pre-

¹ Contribution from the Southern Regional Beef Cattle Breeding Project.

² Creep feeding is a method of feeding young livestock inside of an enclosure so fenced that only young animals can enter.

³ Italic numbers enclosed by parentheses refer to Literature Cited at end of report.

weaning gains 35 to 50 pounds, but the calves lacked the finish necessary to sell as slaughter calves. Nelson et al. (10) reported that creep-fed spring calves from high quality grade Hereford cows averaged only 30 pounds heavier and were less profitable than non-creep-fed calves when sold as feeders. Temple (13) found that creep feeding crossbred calves from 150 days of age to weaning did not increase the grade and weight enough to offset additional feed costs.

In a 4-year study with fall-dropped calves, Nelson et al. (11) found that creep feeding increased gains from 50 to 100 pounds but was profitable in only 1 year. They reported, however, that creep feeding profitably increased weaning weights of calves from first-calf heifers.

Advantages other than weight and grade have been reported for creep feeding. These included

increased gains of the dams of creep-fed calves that may affect conception rates in the subsequent breeding season. Black and Trowbridge (1) and Jones and Jones (9) reported that dams of creep-fed calves outgained dams of non-creep-fed calves during the nursing period. However, Foster et al. (6), Johnson and Fenn (8), and Nelson et al. (11) found essentially no difference in weight change of cows due to creep feeding their calves.

The growth rate of calves at the West Central Florida Experiment Station at Brooksville, Fla., had been traditionally unsatisfactory, according to Burns et al. (3). There were available a wide diversity of cattle, including Brahman, British, and crossbred foundation groups for testing the value of creep feeding under Florida conditions. Consequently, the trial reported herein was started in 1958.

EXPERIMENTAL MATERIALS AND METHODS

During a 4-year period, a total of 661 calves in the following five breed groups were involved in the study: Brahman, two crossbred foundation groups (Santa Gertrudis and Brahman-Angus mated inter se), Hereford, and Angus. After weaning in mid-August each year and prior to the birth of the next calf, the cows in each breed group that were diagnosed pregnant by rectal palpation were randomly allotted to two groups. The subsequent calf crop from one group had access to supplemental feed for a period of approximately 60 days

prior to weaning, whereas calves from the other group served as a control and received no supplement. Since the cows were divided into single sire herds during the breeding season from March 15 to June 15, creep feeding was not started until after the breeding season in order to prevent confounding creep treatment with sires. This resulted in a somewhat shorter feeding period than most of those reported in the literature. All calves were weighed when weaned at an average age of 215 days. A market grade at weaning was given each calf by

at least three members of the Florida Agricultural Experiment Station staff, and the average of these was used in the analysis.

The feed used in these trials consisted of either a mixture of 40 percent ground snapped corn, 25 percent ground corn, 25 percent citrus pulp, and 10 percent cottonseed meal mixed at the station or a commercial creep ration of approximately the same composition. Feed was put out twice weekly in covered troughs located in areas frequented by the cattle. Attempts were made to put out just enough feed to last until the next feeding time. Orts were measured weekly for groups that failed to eat all the feed.

The various cow herds were grazed on similar improved grass pastures consisting primarily of bahiagrass with access to some pangolagrass and coastal bermudagrass. Approximately 25 percent of the area received an application of 400 pounds per acre of 10-10-10 (NPK) fertilizer each year. The pastures were stocked at the rate of approximately one animal unit per 5 acres of pasture.

Feed intake by breed group was studied the first 2 years only. During the first year, the British breeds (Hereford and Angus) were fed as one group, the crossbred foundation calves (Santa Gertrudis and Brahman-Angus) composed a second group, and the Brahman calves were fed separately as the third group. During the second year the five breed groups were fed separately.

Nineteen-month weight and postweaning gain were obtained for 251

heifer calves that were kept as replacements for the cow herds. Only 3 years postweaning data were obtained on the Brahman-Angus heifers because of the dispersal of that herd. All cows were weighed quarterly, and their gains during the lactation period were calculated.

These data were analyzed by the least squares method for disproportionate subclass members (7). Constants for year, breed, age of dam, sex of calf, and creep were fitted for unadjusted weight and market grade at weaning on all calves. The same model, excluding sex, was used for weaning weight and 19-month replacement heifer weight. All possible first order interactions involving creep were included in both models.

Weaning weights unadjusted for age of calf were used to evaluate response because the objective of this study was to measure production in total pounds of calf rather than weight at a constant age. Cobb et al. (4) working with data from the same herd, reported a significant breed effect on age of weaning. Consequently, age of calf was not included in this model since breed effects on total production were of interest. The average ages of creep-fed and non-creep-fed calves were similar in all breed groups. It will also be noted that some selection was practiced on the heifer calves at weaning, resulting in fewer numbers in the postweaning data than at weaning. No analysis was made of postweaning gain, and the least squares means reported were obtained by difference.

EXPERIMENTAL RESULTS AND DISCUSSION

Feed Intake and Efficiency of Gain

The straightbred British calves ate more feed in both years than calves of the other breed groups (table 1). Crossbred calves were intermediate in feed intake, and straightbred Brahman calves ate very little in 1958 and none in 1959. Feed intake was measured in the first 2 years only. Response to creep feeding during these 2 years was greater than in subsequent years (table 2). Calves that ate the most supplemental feed were not necessarily the most efficient in conversion of feed to gain, which may indicate that they were substituting creep feed for milk and grass. Consequently, these calves were failing to produce the additional gain expected from the amount of feed consumed. The feed required per 100 pounds additional gain shown in table 1 is comparable to or lower

than that reported by many scientists.

Weaning Weight

Table 2 shows the number of calves and the least squares means for the various classifications. The least squares means show a 30-pound average advantage in weaning weight for the creep-fed calves. Calves were considerably heavier in 1961 than in other years. However, the response to creep feeding was least favorable in 1961, and there was a significant year \times creep interaction. There was an advantage for creep feeding in all breed groups, and differences in the response of breeds to creep feeding were statistically nonsignificant as shown by the nonsignificant breed \times creep interaction (table 3). There was a significant age of dam

TABLE 1.—*Feed intake by breed and year*

Year and breed	Calves	Days fed	Feed consumed per head	Additional gain per head due to creep feeding at 205-day weight	Feed required to produce an additional 100 pounds of gain
	Number		Pounds	Pounds	Pounds
1958:					
Angus and Hereford	28	57	267. 8	36. 8	728
Brahman-Angus and Santa Gertrudis	52	57	144. 2	22. 0	655
Brahman	6	57	8. 3	-12. 2	-----
1959:					
Angus	20	57	249. 4	51. 4	485
Hereford	15	57	297. 0	58. 8	505
Brahman-Angus	28	57	166. 2	31. 8	523
Santa Gertrudis	16	57	101. 2	29. 4	344
Brahman	9	57	0. 0	-9. 8	-----

TABLE 2.—*Numbers and least squares means for all calves at weaning*

Classification	Calves ¹	Least squares means			
		Weaning weight		Market grade ²	
		Noncreep	Creep	Noncreep	Creep
	<i>Number</i>	<i>Pounds</i>	<i>Pounds</i>		
General mean.....	661	399	429	9.0	10.0
Year:					
1958.....	167	380	408	8.2	9.6
1959.....	168	383	437	8.5	10.0
1960.....	154	392	416	9.1	10.0
1961.....	172	446	452	10.2	10.3
Breed:					
Angus.....	148	377	401	9.0	10.1
Hereford.....	113	362	414	8.6	10.0
Brahman.....	66	396	404	8.9	9.0
Brahman-Angus.....	205	405	439	9.0	9.9
Santa Gertrudis.....	129	461	483	9.5	10.4
Age of dam:					
2 and 3 years.....	176	393	429	8.9	9.9
4 years.....	93	383	416	8.7	9.9
5 years and over.....	392	424	436	9.4	10.2
Sex of calf:					
Male.....	347	416	444	8.8	9.8
Female.....	314	384	412	9.1	10.2

¹ Calves were approximately equally distributed between creep and noncreep groups.

² Market grade system: High standard, 8; low good, 9; average good, 10; high good, 11; etc.

× creep interaction ($P < 0.01$) in which creep feeding produced a greater effect on the calves of younger cows. Even though male calves were considerably heavier than females at weaning, there was no sex difference in response to creep feeding.

Market Grade at Weaning

There were significant year, breed, and creep effects ($P < 0.01$) and age of dam and sex effects ($P < 0.05$) on grade at weaning (table 3). Increases in market grade due to creep feeding varied considerably from year to year and resulted in a significant year × creep

interaction ($P < 0.01$). The significant breed × creep interaction ($P < 0.05$) was a result of the slight response to creep feeding by the Brahman compared with an appreciable improvement in grade by the other breeds. Calves from cows 5 years of age or older graded slightly higher than those from younger cows; female calves graded slightly higher than male calves, but these differences were not significantly changed by creep feeding.

Postweaning Performance

The least squares means for weaning weight, 19-month weight, and postweaning gain for replacement

TABLE 3.—*Analysis of variance for weaning and postweaning data (mean squares)*

Source	Weaning			Postweaning	
	Degrees of freedom	Weight	Grade	Degrees of freedom	19-month weight
Total.....	660			250	
Year (Y).....	3	95, 446** ¹	57. 46**	3	280, 447**
Breed (B).....	4	156, 371**	11. 69**	4	111, 815**
Sex (S).....	1	172, 085**	10. 59*		
Age of dam (A).....	2	38, 287**	10. 45*	2	7, 425
Creep (C).....	1	90, 136**	107. 04**	1	4, 377
Y × C.....	3	16, 534**	16. 45**	3	1, 944
B × C.....	4	6, 284	7. 61*	4	3, 148
S × C.....	1	60	2. 73		
A × C.....	2	11, 262**	1. 72	2	2, 313
Other interactions.....	211	3, 526	2. 20	70	3, 626
Within.....	428	2, 968	2. 39	161	4, 619

¹ * and ** indicate statistical significance at $P < 0.05$ and $P < 0.01$, respectively.

heifers are shown in table 4. There was no significant creep effect on 19-month weight of replacement heifers. There were significant year and breed effects ($P < 0.01$) on 18-month weight, but there was no creep × breed or creep × age of dam interaction. The compensatory growth of the heifer calves during postweaning tended to offset most of the preweaning advantages for creep feeding. This tendency indicates that calves kept on a growing ration after weaning are not likely to benefit much from creep feeding.

Weight Change of Dams

Creep feeding had no significant effect on the weight change of dams during the nursing period. Cows with creep-fed calves gained 53 pounds compared with 51 pounds gained by cows nursing non-creep-fed calves. The average gain by

breeds was 83, 70, 44, 42, and 22 pounds, respectively, for the Hereford, Angus, Santa Gertrudis, Brahman-Angus, and Brahman cows.

Although creep feeding had a significant overall effect on the preweaning performance of calves, resulting in increases of 30 pounds in weaning weights and one-third of a slaughter grade, responses were not uniform for all breeds or in all years. Yearly differences are to be expected in this type of data because of the variations in climatic conditions and their effects on forage production. Years in which weaning weights and market grades were highest were least favorable to creep feeding, indicating that adequate forage was available for good milk production by the dams and possibly direct utilization by the calves. It is surprising that the breed × creep interaction for weaning

TABLE 4.—*Number of calves and least squares means for replacement heifers*

Classifications	Calves	Least squares means		
		Weaning weight	19-month weight	Postweaning gain ¹
	<i>Number</i>	<i>Pounds</i>	<i>Pounds</i>	<i>Pounds</i>
General mean.....	251	405	655	250
Year:				
1958.....	81	384	583	199
1959.....	69	418	673	255
1960.....	57	389	607	218
1961.....	44	429	757	328
Breed:				
Angus.....	56	391	615	224
Hereford.....	49	384	607	223
Brahman.....	26	376	656	280
Brahman-Angus.....	65	413	677	264
Santa Gertrudis.....	55	461	721	260
Age of dam:				
2 and 3 years.....	67	407	659	252
4 years.....	38	394	641	247
5 years and over.....	146	413	664	251
Feeding method:				
Noncreep.....	122	391	650	259
Creep.....	129	419	660	241

¹ Difference between least squares means of weaning weight and 19-month weight.

weights was nonsignificant. However, the numbers in the Brahman groups were small compared with those in other breeds, and the response to feeding was not great in any breed.

In general, the breeds assumed to have the poorest milking ability responded most to creep feeding, and all responses appear to be directly related to feed intake, which probably is a reflection on the milking ability of the dams. Further evidence that response is related to milking ability is the greater effect creep feeding had on calves from the young cows.

Since the calves were not sold at weaning, no financial figures are available, but with a normal price relationship between beef and breed, the slight advantage in weight and grade resulting from creep feeding in this study would not be sufficient to offset the cost of feed and labor. However, the average age of calves in these trials when first offered creep feed was approximately 155 days, and it is known that calves will utilize supplemental feed at a much earlier age. It can be speculated that the response would have been greater had the creep period been longer.

SUMMARY

A 4-year study that involved 661 calves from five breed groups, showed that creep feeding for ap-

proximately 60 days prior to weaning increased the weaning weights of calves 30 pounds and raised the

market grade at weaning one-third of a grade. The creep-fed calves ate an average of 583 pounds of creep feed for each 100 pounds they gained over the weight of non-creep-fed calves. The straightbred British calves ate the most feed, the crossbred foundation calves ate the next most feed, and the Brahmans ate very little feed. Response of the various breeds was, in general, positively related to feed intake and negatively related to the assumed

milking ability of the dams.

Postweaning gain of 251 replacement heifer calves was 18 pounds in favor of the calves that were not creep fed before weaning. This compensatory gain was not sufficient to completely offset the preweaning advantage for creep-fed calves. These maintained a 10-pound advantage in weight at 19 months of age. Creep feeding had no effect on the weight gain of the dams during the nursing period.

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